

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

DRAWINGS ATTACHED

Lock-Nut

I, CURT HERMANN HANFLAND, a German citizen of 62 Laustrasse, Stuttgart-Sonnenberg, Germany do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to lock-nuts of the kind having an incision lying cross-wise to the axis of the nut and located towards one end of the nut body, the spring portion formed by the incision becoming deformed by compression in the direction of the axis of the nut and thus forming an elastic or resilient securing element.

An object of the invention is to provide a lock nut of this kind with as long a spring as possible, of great elasticity and stability.

According to the present invention a self locking nut has at least two slots in the upper third of the nut body, which slots are symmetrically arranged about the nut axis, are formed by arcuate cuts, extend in the general angular direction as the thread of the nut and are inclined to the axis of the nut at an angle greater than the thread pitch angle, the planes of the slots crossing each other and the wedge springs formed by the slots being deformed towards the major portion of the nut body.

Advantageously, two such incisions placed cross-wise to the axis of the nut are displaced relative to one another by 180° and, preferably, the middle points of the circular incisions as well as the middle point of the nut, seen in plan, lie on a common straight line.

If, according to a further feature of the invention, a separating slot is provided perpendicularly to each oblique slot and tangentially to the curved inner end thereof thus to define two wedge springs having a thread

root common with the body of the nut. It is recommended to arrange the separating slots such that they lie opposite one another, and that the root of each wedge spring lies at a corner of the nut.

In some embodiments of the invention it is advantageous to provide above the wedge spring a known extension collar. In one form of the invention there are provided three oblique slots displaced relative to one another by 120°. By means of the arrangement of the extension collar, the height of which is measured corresponding to the forces acting in the wedge spring, it is possible to form the wedge spring either thinner or thicker according to the intended demand and uses of the nut, thereby having it thinner and thus more elastic or thicker and thereby also stronger and more rigid. By means of the arrangement of the extension collar the wedge spring is held at this place elastically opposite a solid hexagonal material. The separating slots, where provided, will extend also through the collar and they are arranged on opposite sides of a radial plane connecting two corners of the nut.

Advantages of the nut constructed in accordance with the above invention consist in that the spring parts may be made longer than in single slot nuts. This is particularly advantageous in nuts of large dimensions and in special nuts. Due to the lengthened wedge spring a greater elasticity and stability of the spring is rendered possible so that upon frequent screwing of the nuts on and off a greatest uniformity in securing movement is ensured. A further advantage consists in that the nut according to the invention can be screwed on completely parallel to the longitudinal axis of the bolt, as the tilting phenomenon in nuts without such securing means is avoided. Such tilting

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phenomenon occurs in nuts without securing means because due to their tolerance the said nuts must first pivot on the workpiece until drawn up into place by movement of rotation. Compared with known nuts there is the further advantage that the nut according to the invention is lighter in weight because, for example, a wedge spring is of less weight than the two securing arms provided in known constructions which are applied additionally above the axial body of the nut. A further essential advantage consists finally in that any usual standard nut can be converted by the arrangement of the slots into a lock nut having the features of the invention, and standard nuts of large dimensions can be made into lock nuts having the greatest possible advantages and without additional expenditure.

Several embodiments of the invention are illustrated in the accompanying drawings, in which each of the ten Figures includes a plan and a side elevation of a nut. Referring now to the drawings, in the body of the nut 1, the axis of which is shown at 4, there are cut in the upper third of said body, by means of a circular cutter, two slots 2 and 3 which are therefore formed by arcuate cuts. The slots 2, 3 lie in the planes generally in the direction of the thread (that is inclined to the nut axis by a few minutes more than the thread pitch angle) at opposite sides of the axis 4 and are so displaced relatively to one another that they lie exactly diametrically opposite each other, the said planes of the two slots 2, 3 as seen from the front (Fig. 1) crossing in the point 5.

As can be seen from the plan in Fig. 1, the two incisions 2, 3 displaced relatively to one another by 180° and lying crosswise to the axis 4 of the nut define two wedge springs 6, 7, the roots 8, 9 of such springs also lying diametrically opposite each other and preferably coinciding with two opposite corners 10, 11 of the nut 1. From Fig. 1 it further follows that the slots 2, 3 are so arranged that they lie exactly symmetrically about the axis 4 of the nut.

Due to the fact that the slots lie generally in the directions of the thread pitch, the two extended planes of the two slots 2, 3 cross one another as shown in Fig. 1. From the plan in Fig. 1 it is furthermore seen that the middle points of the circular incisions 2, 3 and the axis of the nut 1 lie on a plane A-A.

In Fig. 2 there is illustrated in plan and in side elevation a nut according to the invention which includes an extension collar 12. As can be seen, the incisions 2', 3' are arranged in a manner corresponding to the incisions in Fig. 1. The arrangement of the extension collar 12 gives the possibility of dimensioning this independently of the

dimensioning of the nut. The extension collar 12 thus provides an additional part saving weight so that the wedge spring itself can, in case of need, be made thinner or thicker, or more elastic or more rigid.

In Figs. 3 and 4 is shown an arrangement of additional slots 13 and 14 extending at right angles to the slots 2 and 3 and separating the ends of the wedge springs from the nut. These additional or separating slots are arranged so that they are in the upper third portion of the nut body 1 tangentially to the curved inner end of the slots 2a and 3a. By means of such separating slots 13, 14 in the head of the nut, two side wedge springs 6a, 7a have their roots 9a and 8a arranged opposite one another, the root 9a belonging to the wedge spring 6a, and the root 8a belonging to the wedge spring 7a. Advantageously the separating slots 13, 14 are arranged in line and at opposite sides of a radial plane passing through opposed corners of the nut, as shown whereby the roots of each wedge spring 6a and 7a lie on a corner.

Fig. 4 shows a construction of the lock nut according to Fig. 3 but with an extension collar 12a similar to the head 12 of Fig. 2. Here the separating slots 13, 14, as can be seen from the drawing, are extended through the extension collar 12a.

In the construction of nut illustrated in Figs. 5 and 6 it is a question of particularly large nuts which, however, also correspond to the normal standards. For attaining the same effects here, three incisions 16, 17, 18 are provided almost at right angles to the axis 15 of the nut. As shown in the plan in Fig. 5 the incisions are symmetrical about the axis B-B and are displaced relatively to one another by 120° . Here also the arrangement is such that the roots 19, 20 and 21 of the wedge springs 22, 23 and 24 lie in the region of corners of the nut.

The nut according to Fig. 6 differs from that according to Fig. 5 only in that an extension collar 25 is added. In the embodiments according to Figs. 7 and 8 there are provided in the nut 26, the latter having three incisions 30, 31, 32 corresponding to those in Figs. 5 and 6, separating slots 27, 28, 29 which are disposed adjacent their respective curved inner ends of the almost horizontally placed rounded slots as indicated at 30, 31, 32.

Here also the separating slots 27, 28, 29 are so arranged that the roots of the resilient wedge-springs formed by the slots lie in the area of corners of the nut. Fig. 8 shows the same arrangement as Fig. 7 but in a nut with an extension collar 33 added.

The securing effect is obtained in all embodiments by deformation, for example ovalising or the like, the permitted degree of deformation being determined by the

width of the separating slots. As is apparent from the drawings, in particular the side views and for example those in Figs. 3 and 4, with the arrangement of separating slots 13 and 14 (Fig. 3) the free ends of the wedge springs are pressed downwards in the direction towards the body of the nut, and are thus inclined, whereby the desired deformation for the obtaining of the securing effect is attained.

In the embodiment according to Figs. 9 and 10 there are provided four slots 33, 34, 35 and 36, lying symmetrically around the axis of the nut. As here it is a question of a round nut with four axial grooves in its periphery, as distinct from a flat-sided nut, the slots 33 to 36 are placed symmetrically with respect to the said grooves. Fig. 8 shows this construction without an extension collar whilst in Fig. 10 an extension collar 37 is provided.

The performance of the invention involves the use of the invention described and claimed in Specification 1013253.

25 WHAT I CLAIM IS:—

1. A self locking nut having at least two slots in the upper third of the nut body, which slots are symmetrically arranged about the nut axis, are formed by arcuate cuts, extend in the same general angular direction as the thread of the nut, and are inclined to the axis of the nut at an angle greater than the thread pitch angle, the planes of the slots crossing each other and the wedge springs formed by the slots being deformed towards the major portion of the nut body.

2. A nut as claimed in claim 1, wherein

the said angle is greater than the thread pitch angle by a few minutes.

3. A nut as claimed in claim 1, or claim 2, characterised in that separating slots are provided extending from the upper face of the nut to meet each oblique slot, the separating slots being arranged perpendicularly to the slot and, tangentially to the arcuate inner end of the slot.

4. A nut as claimed in Claim 3, characterised in that the wedge springs are deformed, for example, by ovalisation.

5. A nut as claimed in any one of the preceding claims characterised in that three slots are provided.

6. A nut as claimed in any one of the preceding claims, characterised in that a collar is provided above the wedge spring.

7. A lock nut as claimed in claim 6 when dependant on claim 3 wherein the separating slots pass through the collar.

8. A nut as claimed in claim 3 or any claim dependent thereon, characterised in that the separating slots are arranged on opposite sides of a radial plane connecting two corners of the nut.

9. A self locking nut substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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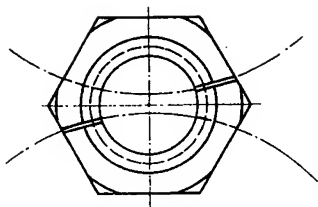


Fig. 4

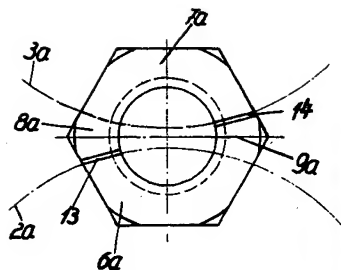
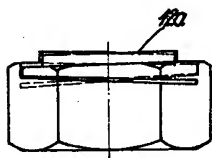


Fig. 3

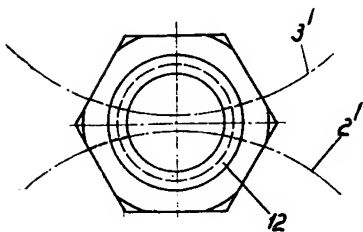
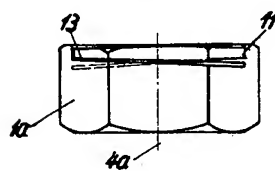


Fig. 2

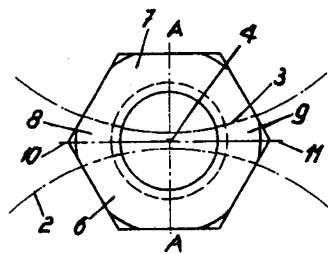
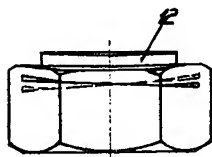
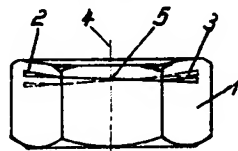


Fig. 1



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SHEETS 1 & 2

4 SHEETS

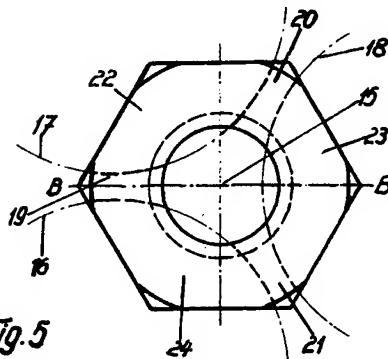


Fig. 5

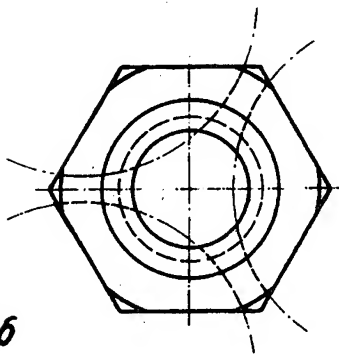
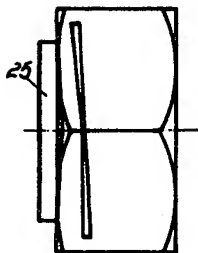


Fig. 6

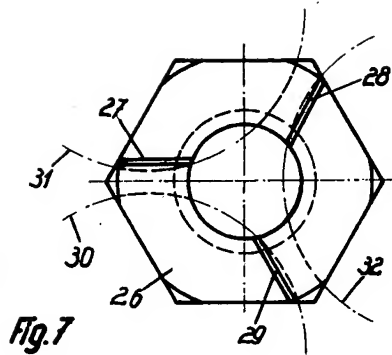
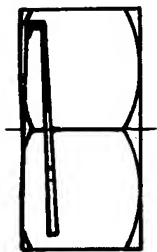


Fig. 7

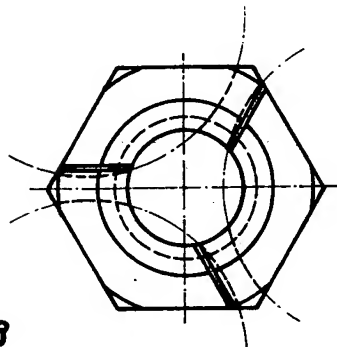
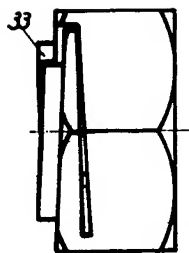


Fig. 8

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4 SHEETS

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SHEETS 3 & 4

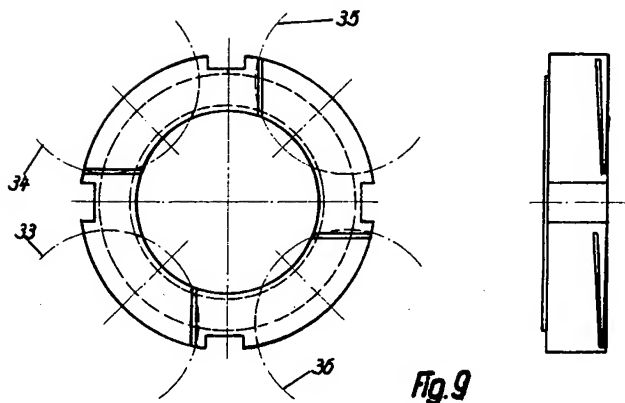


Fig. 9

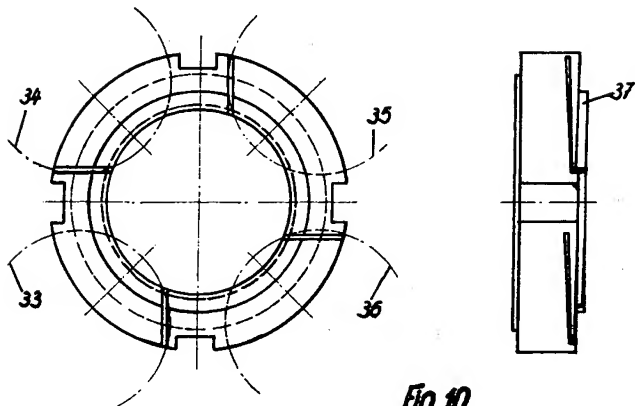


Fig. 10